

## I. REMARKS

Claims 1-10 and 12-25 are pending in this case. Of these, claims 1-9, 16-19, 23 and 25 stand rejected under 35 U.S.A. Section 103 (a) over the asserted combination of Kanakkanatt '643 in view of Corval et al.; and claims 10, 12-15, 20-22 and 24 stand rejected over the asserted combination of Kanakkanatt '643 in view of Patel et al., U.S. Patent No. 3,999,946. For the reasons given, Applicants respectfully disagree, and further submit that the claimed invention patentably defines over the cited art.

### *A. The Claimed Invention is Patentable Over the Argued Combination of Kanakkanatt in View of Corval et al.*

Turning first to the rejection of claims 1-9, 16-19, 23 and 25 (which set comprises the two independent claims 1 and 19), the examiner acknowledges that Kanakkanatt fails to teach a crystalline indicator having photochromic properties characterized by discoloration following photo-induced coloration, where the discoloration proceeds as a function of both time and temperature. This deficiency notwithstanding, the examiner argues that such compounds are disclosed in the Corval et. al publication and that, because Kanakkanatt teaches photochromic and thermochromic dyes used to indicate the exposure of food packaging to certain temperatures and/or wavelengths of light, “[i]t would have been obvious to one of ordinary skill in the art to use [the compounds of Corval et al.] in the packaging materials of Kanakkanatt '643 due to their unique ability to change visually in response to radiation light and in response to temperature.” Official Action, p. 3.

*Inter alia*, a *prima facie* case of obviousness **requires** that the prior art teach or suggest the asserted combination. *See, e.g.*, M.P.E.P. § 2143. Instantly, however, there is no such motivation to be found in the references. Rather, the argued basis for the

combination is the substitution of the supposedly equivalent compounds of Corval et al. for those of Kanakkanatt, which argument is improperly premised upon M.P.E.P. Section 2144.06.

In order to support a case of obviousness using the substitution of one compound for another, “*the equivalency must be recognized in the prior art*, and cannot be based on applicant’s disclosure or the mere fact that the components at issue are functional or mechanical equivalents.” M.P.E.P. § 2144.06 (*emphasis added*). Here, the disclosure of Corval et al. teach photochromic materials -- more particularly,  $\alpha$ -DNBP’s -- with time and temperature dependent discoloration having possible applications “as optically bistable systems for optical data storage.” *J. Phys. Chem.* 1996, 100, 19315. In contrast, the *separate* photochromic and thermochromic dyes of Kanakkanatt -- including, for example, the photochromic dyes polyalkylbenzoindolino, triarylmethane leuco dyes, and benzoindolinospiropyran, and themochromic dyes made by reacting alcohols, esters, or organic acids with such intermediates as crystal violet lactone and malachite green -- are taught for packaging materials in order to indicate, in the case of the thermochromic dyes, “whether a polymer is currently or has in the past been exposed *to a particular temperature*,” p. 4 at lines 4-8 (*emphasis added*), and, in the case of photochromic dyes, “whether a packaged food or medical product has been partially or fully sterilized by an irradiation process.” *Id.* at p. 3, lines 12-14. These dyes of Kanakkanatt are decidedly *not* materials taught to display a discoloration as a function of time and temperature. In short, the references teach *different* compounds of *different* character for *different* purposes.

Given the foregoing distinctions between the materials of Corval et al. and Kanakkanatt, as well as the differences in their recognized applications, there is simply

no basis for asserting a recognized equivalency in the prior art. If there is any motivation to make the combination, it derives only impermissibly from Applicants' own disclosure. Accordingly, the asserted obviousness of the substitution is without merit.

Even assuming, *arguendo*, that this alleged substitution is properly motivated, the asserted combination fails to teach the claimed invention. Accordingly, the examiner still has not made out a *prima facie* case of obviousness. *See, e.g.*, M.P.E.P. § 2143 (*Inter alia*, a *prima facie* case of obviousness requires that the references must teach or suggest all claimed limitations).

As indicated, Kanakkanatt admittedly fails to teach Applicant's instantly claimed time-temperature integrator comprising at least one reversible, crystalline indicator characterized by discoloration following photo-induced coloration, such discoloration proceeding as a function of both time and temperature. Rather, the *only photo-induced* materials taught in Kanakkanatt, photochromic dyes, are characterized by a visual color change in response to exposure to specific irradiation frequencies, the reversal of which color change is a function of time in proportion to the duration of the initial exposure.

Turning then to the teaching of Corval et al., and even otherwise accepting, *arguendo*, the examiner's characterization of that publication, it is the case that Corval et al. do not in fact teach the *crystalline* photochromic materials as instantly claimed. Accordingly, the argued combination, even assuming the propriety thereof, fails to disclose the claimed invention.

The base claims being clearly patentable over the cited references, Applicants respectfully submit that the rejection of the remaining claims 2-9, 16-18, 23 and 25 is rendered moot. This fact notwithstanding, Applicants note that the art of record, taken

alone or in any permissible combination, fails to either anticipate or render obvious the invention of these claims. Should the examiner maintain the rejections to the claims, Applicants reserve the right to place the claims in allowable form, argue the patentability thereof, and/or appeal such rejection.

*B. The Claimed Invention is Patentable Over the Argued Combination of Kanakkanatt in View of Patel et al.*

Referring next to the rejection of dependent claims 10, 12-15, 20-22 and 24, the same is, in the first instance, improperly laid in view of the fact that Kanakkanatt and Patel et al., taken alone or in combination, fail to anticipate or render obvious the invention of *either of the independent claims* 1 and 19. And, of course, this defect cannot be made up by further reliance on Corval et al., at least for the reasons already given in respect to the rejection of the independent claims.

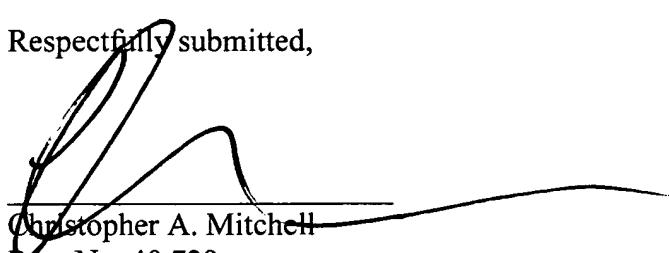
The foregoing notwithstanding, and even accepting, for the sake of argument, the examiner's characterization of the Patel et al. and Kanakkanatt references and the alleged motivation to combine, Kanakkanatt and Patel et al. fail to render obvious the invention of either of independent claims 1 or 19 at least because neither reference teaches a packaging substrate having a time-temperature integrator comprising at least one reversible, crystalline indicator with photochromic properties, the at least one reversible indicator characterized by discoloration following photo-induced coloration thereof which proceeds as a function of both time and temperature. On the contrary, Kanakkanatt teaches photochromic and thermochromic dyes distinguished from the present invention at least for the reasons already noted, while Patel et al. teaches non-photochromic compositions containing conjugated acetylene groups which exhibit irreversible color changes (tending toward increasing intensity) in response to time and temperature.

Despite these defects, and in particular reference to the invention of the presently rejected *dependent* claims, it is further noted that neither Kanakannatt or Patel et al. teach a time-temperature integrator comprising at least two reversible, crystalline indicators with photochromic properties, each of the at least two reversible crystalline indicators having different characteristic time domains, as in claim 10 of Applicants' invention. Nor does either reference teach, as recited in claims 12 and 21 of the pending application, such a substrate as Applicants disclose wherein at least one *irreversible* indicator *having photochromic properties* is arranged in the region of the reversible indicator.

## II. CONCLUSION

In view of the foregoing, Applicants submit that the pending claims are in condition for immediate allowance. Of course, the examiner is invited to contact Applicants' undersigned counsel if she should have any questions respecting this paper, or if a telephone interview might otherwise expedite the prosecution of this case.

Respectfully submitted,

  
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